AMENDMENTS TO THE CLAIMS

Claims 1-2 (canceled)

Claim 3 (currently amended):

The display device of claim ~~1~~ 21 wherein the lighted array is comprised of obscured or pigmented light emitting diodes; whereby the kinetic visual display is rendered substantially more readable than clear diodes.

B1 cont

Claims 4-8 (canceled)

Claim 9 (currently amended):

The display device of claim ~~1~~ 21 further including a means of packaging the lighted array thereby ~~protecting the device and providing space for imprinting~~ providing room on the label of said device, for printed advertising graphics, sponsor names, or logos, enabling it to be used as a sales promotional item.

Claims 10-12 (canceled)

Claim 13 (currently amended):

The display device of claim ~~1~~ 21 wherein each lighted array of said multiplicity of lighted arrays, form part of a graphic image; said parts of a graphic image being displayed as the device is moved through space forming a kinetic light puzzle; said controller responding to the users

kinetic motions, allowing the user to control where the parts of a graphic image appear in space; whereby the complete image is assembled in the visual display only when the device is waved at the predetermined correct speed and swing width.

Claim 14 (currently amended):

The display device of claim ~~1~~ 21 wherein the lighted array is comprised of a complete character display element; said controller energizing the display after data for a complete character has been sent to the display; whereby the display is generated a character at a time as the device is moved through space.

Claim 15 (currently amended):

A kinetic device and method for producing visual displays comprising: a single or multiplicity of lighted arrays comprised of at least one light emitting element; a controller coupled to the elements of the lighted array; an inertia reversal sensor which is able to detect reversals in the direction of inertia imposed upon it; said controller being programmed to detect adjacent inertia reversals through means of the inertia reversal sensor; the inertia reversal sensor providing ~~turn on and turn off detection~~ the ability to modify the function or type of display based on the kinetic energy applied to the sensor; said controller being programmed to deliver display data in a columnar piecewise fashion to said lighted array; said lighted array comprised of at least one style of predetermined graphics shape or alphanumeric characters; whereby the predetermined graphics or alphanumeric characters appear and hang in mid air when the device is moved through ~~space;~~ space.

Claim 16 (original):

A kinetic device and method for producing visual displays comprising: a single or multiplicity of lighted arrays comprised of a least one light emitting element; a controller coupled to the elements of the lighted array; said controller being programmed to deliver display data in a columnar piecewise fashion to said lighted array; the lighted array being substantially fixed in position and relying on the observer to provide the kinetic motion required to produce a visual display by scanning the observer's eyes past the lighted array.

Bent

Claim 17 (currently amended):

The display device of claim 16 pivotably mounted, such that the lighted array sweeps rotationally around the circumference of a circle; without position sensors; the speed of rotation being variable; whereby a visual display is produced which appears stable or precedes or recedes around a central pivot point.

Claim 18 (currently amended):

The display device of claim ~~17~~ 16 further ~~including a rotational position sensing means for differentiating the upper half, from the lower half of the circle circumscribed by the lighted array;~~ coupled to a motor means which moves the array; the display being adjusted such that the text and graphics displayed in the lower half of the circle are correctly oriented, matching the orientation of graphics in the upper half of the circle; whereby a viewer is enabled to view a display in which no text or graphics are inverted.

Claim 19 (original):

The display device of claim 16 wherein the lighted array is slanted, arched, angled, or pointed, such that the eyes of the viewer are thereby guided to scan the array in the direction pointed to by the array; whereby the viewer is enabled to see visual displays which are correctly oriented when scanned in the direction indicated by the inclination of the lighted array.

Claim 20 (original):

The display device of claim 16 wherein the array is integrated into articles of clothing, notebooks, and other items; whereby a visual display is produced when the viewer's eyes scan across the lighted array.

Claim 21 (new):

A device and method for producing visual displays based on the persistence of vision effect of human vision, comprising: (a) a single or multiplicity of lighted arrays comprised of at least one light emitting element; (b) a controller coupled to the lighted arrays and to a power source; (c) said controller coupled to an inertia reversal sensor which is physically located within the lighted array; (d) said controller programmed to illuminate the lighted array elements; (e) said program illuminating the lighted array in accordance with saved display data, in a columnar piecewise fashion, synchronized to the kinetic motion of the device in a motion controlled method; (f) said motion controlled method being derived from detected adjacent inertia reversals, of the immediately previous swing; said adjacent inertia reversals indicating that a half-cycle swing has occurred; counting the number of columns of display data that was displayed in the previous

half-cycle swing and then changing the column delay accordingly, such that all columns of display data fit within the half-cycle swing in preparation for the next swing; (g) display data being sent to the lighted array only on the leading half-cycle swing, not the returning half-cycle swing; whereby a visual display is produced that is synchronized with the users kinetic motions.

Claim 22 (new):

The display device of claim 21 wherein the display data is stored in a shorthand format; such that spaces are removed from the stored data but are implicitly indicated by changing the case of the stored character; thereby enabling the storage of substantially more display data while still being able to display spaces in proper places.

Claim 23 (new):

A handheld kinetic device and method for producing visual displays comprising: a single or multiplicity of lighted arrays comprised of at least one light emitting element; said light emitting elements mounted such that the light emitted is directed in a 360 degree doughnut shaped light pattern surrounding the device; an inertia reversal sensor which detects adjacent inertia reversals in any two opposing directions independent of how the device rotates in hand during use; a controller coupled to the elements of the lighted array; coupled to a power source; said controller being programmed to deliver display data to the lighted array, whereby visual images are displayed in the air which are visible for 360 degrees around the device when it is moved through space.

Claim 24 (new):

The display device of claim 21, wherein the lighted array is comprised of at least one Ultra Violet Light Emitting Diode element.

Claim 25 (new):

The display device of claim 21, wherein the lighted array is comprised of at least one Organic Light Emitting Diode (OLED) element.

Claim 26 (new):

The display device of claim 16 constructed in such a manner and with minimal parts; whereby the device is considered disposable and able to be discarded after at least a single use.

Claim 27 (new):

The display device of claim 21 constructed in such a manner and with minimal parts; whereby the device is considered disposable and able to be discarded after at least a single use.

Claim 28 (new):

The display device of claim 16 further including a means of packaging the lighted array thereby providing room on the label of said device, for printed advertising graphics, sponsor names, or logos, enabling it to be used as a sales promotional item.

Claim 29 (new):

The display device of claim 21 wherein a mode of operation exists wherein the controller itself randomly selects programmed data for display; whereby the user is not able to select what is displayed but is entertained by the randomness of the display.

B' cont.

Claim 30 (new):

The display device of claim 16 wherein a mode of operation exists wherein the controller itself randomly selects programmed data for display; whereby the user is not able to select what is displayed but is entertained by the randomness of the display.

REMARKS

The claims have been amended editorially and to correct those errors noted by the examiner.

1. The rejection of Claims 1-15 under U.S.C. 112, second paragraph.

Claims 1, 2, 4, 5, 6, 7, 8, 10, 11, 12 have been canceled and replaced with Claims 21, 22, 23, 24, 25, 26, 27, 28, 29, 30 respectively.

Claims 3, 9, 13, 14, 15 have been amended and edited to correct punctuation.

2. The rejection of Claims 16-20 under 35 U.S.C. 102(e) as being anticipated by Molinaroli, USPN 6,265,984 B1.

Claim 16

The applicant states in claim 16 that the lighted array is substantially fixed in position. Here the applicant is relying on the eye movements of the observer to realize the display, with the lighted array remaining motionless.

Molinaroli teaches that the lighted array is on a yoyo. Thus Molinaroli is relying on the rotational motion of the array to sequence the lighted array through a distance so the display can be seen by the observer. The observer being substantially fixed in position.

Applicant teaches in paragraph [0169] through [0179] and in figures 10, 11A, 11B, 11C, 11D, that the lighted array is fixed and relies on the motion of the observer's eyes to produce a subliminal mode display. The observer being distinct from the operator of the device. The device may be mounted on a wall and have no operator, but have many observers. Paragraph [0175] teaches: the observer at first sees merely an array of blinking lights. As an observer

scans his eyes across the lighted array, an image is perceived by the observer. At a distance, this embodiment of the invention will produce displays, which seem to appear out of thin air. Periodically, the stereo-optic properties of the human eye and brain will enhance the effect and a display that is twice as big, or greater, as the lighted array will be perceived.

The invention uses a fixed lighted array to produce a spatial display of text and graphics in a novel and unobvious method. This invention has been reduced to practice and has been demonstrated useful. Rock/Pop music concerts could employ the invention by mounting lighted arrays to the walls of a darkened concert venue. During the concert, the lights begin to blink, as observers scan their eyes around the room, words and graphics will be observed in mid-air all around the concert venue.

We respectfully submit that the fixed array of Claim 16 was not anticipated by Molinaroli and the claim should be allowed.

Claim 17

Applicant has modified Claim 17 to specify that position sensors are not used.

Molinaroli teaches that sensors are needed to keep timing and keep lettering in proper direction. Molinaroli, col. 19, line 45-49. With IR photo emitter(s) 127 the photo sensor 18 would sense the yo-yo string passing by holes 65 between each yo-yo half and thus keep timing like a reed/magnet switch would and with a second photo sensor 140 direction could be determined to keep lettering in proper direction.

Applicant has narrowed claim 17 to specify that no sensors are used to produce the display. We respectfully submit that such a device without sensors was not anticipated by Molinaroli and that the claim should be allowed.

Claim 18

Applicant has modified the wording of the claim to state:

18. (amended) The display device of claim 16 further coupled to a motor means which moves the array; the display being adjusted such that the text and graphics displayed in the lower half of the circle are correctly oriented, matching the orientation of graphics in the upper half of the circle; whereby a viewer is enabled to view a display in which no text or graphics are inverted.

We respectfully submit that such a device without sensors was not anticipated by Molinaroli and that the claim should be allowed.

Claim 19

Molinaroli teaches that the lighted array is in motion. Molinaroli, col. 19, line 52-54

The display could have full size letters and graphics on the way up and down, graphics, sentence text when the yo-yo is spinning at the end of the string.

The applicant's Claim 19 is dependant on Claim 16. Claims 19 and 16 both deal with the Subliminal Mode of the invention which has a fixed lighted array as taught in paragraph [0169] through [0179].

Applicant teaches that: 'If the eyes of the viewer are scanned in the opposite direction from the direction the microcontroller is displaying the vertical images slices, the image will appear reversed. This display reversal adds to the wonder of the effect but can be controlled by giving the viewer subconscious clues as to which way to scan his eyes past the lighted array. This is done by making use of a curved lighted array 109 as shown in FIG. 10 or by using an angled lighted array 110 as shown in the lighted array 14 of FIG. 11a. This curved or angled lighted array 14 usually causes the viewers eyes to scan the array from left to right and if the microcontroller is programmed to display from left to right, the display will be observed to be correctly oriented. This same effect is possible with a forward "/" or backward "\" slanted array or arrays pointing left "<" or pointing right ">". Bentley, 10/003,988 paragraphs [0169]-[0179].

This is a novel approach to produce a display which is not obvious and is not anticipated by Molinaroli. We respectfully submit that the claim should be allowed.

Claim 20

Molinaroli teaches that the array is integrated into items such as a yo-yo, figure 25, baseball style cap, figure 21 and shoe display device figures 22 and 23 all of which must be in motion. The Molinaroli baseball hat has a motor built into it to move the lighted array. The shoes depend on the wearer to move his feet to produce a display.

Molinaroli teaches: The microprocessor 13 turns on and off the individual LEDs 12 to allow the display PC board 11, when moved, to give the illusion of alpha-numeric characters, and/or two- or three-dimensional (2-D, 3-D) shapes. Molinaroli, col. 3, lines 46-50.

The applicant teaches that the lighted arrays are substantially fixed in position and are not required to move. The display relies on the motion of the observer's eyes.

Lighted arrays are integrated into articles of clothing, notebooks, badges, and other items and are fixed in position. They appear to be rows of blinking lights until the observer's eyes scan across the array. The display is perceived by the observer as floating in mid-air. We respectfully submit that the fixed array of Claim 20 integrated into clothing, etc., was not anticipated by Molinaroli and the claim should be allowed.

3. The rejection of Claims 1, 3 - 12, 14, and 15 under 35 U.S.C. 102(a) as being unpatentable over Ohta et al., USPN 5,444,456, in view of Molinaroli.

Claims 1 and 15

Applicant Claim 1 has been canceled and Claim 21 has been substituted for it.

Applicant Claim 15 has been modified to remove reference to turn on and turn off detection.

Ohta and Molinaroli both teach that sensors are needed for a stable display.

Ohta teaches: Item 25 is a measuring unit that receives a signal from the sensor switch 24, measures the cycle time of the right and left reciprocating motion and outputs an average value of the measured the cycle time. Ohta, col.5, lines 6-10

Again Ohta teaches: The period between this ON signal outputted from the sensor switch and the next one is measured several times at the measuring unit 25 and the measured values are averaged out. Ohta, col. 5, lines 30-33

Applicant Claim 21 teaches that the cycle time from the immediately previous swing is used to produce the timing needed to center the display.

Applicant teaches in Claim 21: "(f) said motion controlled method being derived from detected adjacent inertia reversals, of the immediately previous swing; said adjacent inertia reversals indicating that a half-cycle swing has occurred; counting the number of columns of display data that was displayed in the previous half-cycle swing and then changing the column delay accordingly, such that all columns of display data fit within the half-cycle swing in preparation for the next swing;" Bentley, 10/003,988 Claim 21.

An unexpected result of this instantaneous timing value, from the previous swing, is that the display responds quickly to changes in the swing of the user. This was unforeseen by Ohta and is evidenced by the fact that he averages the cycle times. This averaging produces a slow responding display which does not respond well to changes in the swing cycle time. Since the preferred embodiment of the applicant's invention is a hand held device, it is important that it respond quickly to changes in the swing cycle. We respectfully submit that the use of cycle times from the immediately previous swing was not anticipated by Ohta and the fact that averaging previous cycle times would render the display slow to respond is unobvious and that the claim should be allowed.

Ohta teaches that the sensor switch is placed above the lighted array.

As shown in FIG. 11, the sensor switch 24 is placed at the upper segment of the LED array and when the display apparatus reaches the extreme left of the reciprocating motion the moveable contact 24c touches on the fixed contacts 24a and 24b turning on the sensor switch. Ohta, col. 5, lines 25-29 and figure 11a.

Ohta clearly teaches in figures 1, 6, 11a, 12, 15,16a, 16b, that the sensor switch is hidden from the view of the user and figure 11a clearly shows it is placed above the lighted array. One skilled in the art would expect that the sensor would operate well in this position since it is at the extreme end of the device, thus giving the sensor switch the full effect of the swing motion. However, practice has shown that this is not the proper location for the sensor.

Applicant teaches that the sensor must be placed inside the lighted array.

Since the inertial reversal sensor is one of the members of the lighted array, the motion of the lighted array is accurately sensed. Bentley, 10/003,988 paragraph [0024]

A lighted array with the sensor centrally located is best for accurately measuring the users swing cycle. See Bentley, 10/003,988 figure 2.

Mounting the sensor inside the lighted array is a novel invention that has unexpected results. As a member of the array, the sensor is visible to the user. This allows the user to easily understand the motion that is required to make the sensor work and in turn, work the device. This is not obvious, since all other patent holders of swing type display devices conceal the sensor. An unexpected result of having the sensor centrally located inside the lighted array is that the sensor, moving back and forth, produces audible clicks at each end of the users swing. This provides auditory and tactile feedback to the user which helps maintain swing speed and therefore produces better displays. Applicant teaches in paragraph [0133], Audible and tactile feedback is also provided to the user by the inertial reversal sensor 28 as the device is swung back and forth. The rhythm the sensor generates makes synchronizing the display easy.

We respectfully submit that placing the sensor inside the lighted array, as a member of the array is unobvious and novel, and that it produces several favorable unexpected results and that the claim should be allowed.

Ohta teaches: In addition, irrespective of the speed of the operator's waving action, images are always displayed in the central area of space and the dimensions of the images are always adjusted to the optimal ones. Ohta, col. 6, lines 6-9.

Molinaroli also teaches: the microprocessor algorithm controls the display timing to appear in the same location and with the same message length each time the device is moved back and forth. Molinaroli, col. 4, lines 57-60.

The applicant claims in Claim 21: the display, being actively adjusted based on the immediately preceding swing, conforms to the kinetic controls of the user. Applicant teaches that the kinetic motions of the user are all important, and they directly effect how the display appears. The ability of the display to adapt to the immediately previous swing cycle, has unexpected results which lend themselves to games, puzzles and other amusements, since the display is not always adjusted for optimal display as Ohta is, and Molinaroli is, the user is able to narrow the size of the displayed characters, widen the size of the characters, slide them to the left, slide them to the right, and even block out parts of the display. For example, if the display is showing the words "I LOVE YOU" when swung in an equal rhythm swing, the user is able to change the display to: "I LOVE" by stopping his swing before the word "YOU" is displayed. Waving the device quickly produces very skinny letters, while waving the device slowly in a wide arc produces wide letters in the display. This ability to "play" with the display is unexpected, and novel and adds to the usefulness and enjoyment of the device. It is a direct result of not averaging the

swing cycles of the user, but instead, using the immediately preceding swing cycle to dictate the timing of the display. We respectfully submit that the claim should be allowed.

Claim 3

Molinaroli teaches that multicolor LEDs 12 are preferred to allow more colorful displays. Molinaroli, col. 4, lines 14-15.

Multicolor LEDs are known in the industry as LEDs with clear lenses, which have two or more light emitting elements, mounted on a single device. The lens of a multicolor LED must be clear so that the light emitted by the elements can be mixed optically, to cause the viewer to see different colors through the same lens.

Applicant's Claim 3 claims: the lighted array is comprised of obscured or pigmented light emitting diodes; whereby the kinetic visual display is rendered substantially more readable than clear diodes.

Applicant claims that the lens on the LEDs must be pigmented to produce the most readable displays. Applicant's practice and experimentation has proved that this novel and unobvious requirement of using pigmented LEDs in the array produces superior displays over clear lens LEDs. A person having ordinary skill in the art would assume to use the brightest, highest intensity modern LEDs available, all of which have clear lenses to produce the visual display. Such a display is demonstrably less readable than a display employing pigmented LEDs. This unexpected result, better displays, using pigmented LEDs over bright clear lenses is not obvious and is a new principal of operation for these displays.

We respectfully submit that the use of pigmented LEDs is unobvious and that the claim should be allowed.

Claim 4

Claim 4 was canceled and a new Claim 23 substituted for it.

Claim 5

Claim 5 was canceled and a new Claim 24 substituted for it.

Claim 6

Claim 6 was canceled and a new Claim 25 substituted for it.

Claim 7

Claim 7 was canceled and a new Claim 26 substituted for it.

Claim 8

Claim 8 was canceled and a new Claim 27 substituted for it.

Claim 9

Claim 9 was amended to read:

9. (currently amended) The display device of claim 21 further including a means of packaging the lighted array thereby providing room on the label of said device, for printed

advertising graphics, sponsor names, or logos, enabling it to be used as a sales promotional item. Such advertising use was not anticipated by Molinaroli or Ohta.

Claim 10

Claim 10 was canceled and a new Claim 28 substituted for it.

Claim 11

Claim 11 was canceled and a new Claim 29 substituted for it.

Claim 12

Claim 12 was canceled and a new Claim 30 substituted for it.

Claim 14

Molinaroli teaches that the display is generated a column of LEDs at a time as the device is moved through space. Molinaroli, figure 1 shows a police officer waving a wand that has a single row array of LEDs. See also figures 2, 4, 5-11. This method of drawing alphanumeric characters can be referred to as a dot matrix method or a columnar piecewise fashion. The matrix is usually a 5X7 grid of dots, 5 vertical rows of 7 dots, which can be used to draw alphanumeric characters, but they are drawn a column of 7 dots at a time.

Applicant teaches in paragraph [0188] "Character at a Time" displays make use of whole character lighted array 114 shown in FIG. 11C, which in turn is made up of a plurality of light emitting element 22. Instead of displaying data in a columnar piecewise fashion, this alternate embodiment displays a complete character or graphic at a time. The microcontroller then delays for a character delay period and then moves on to the next character. The net effect is that the characters or graphics are displayed in the air, a "character at a time." Any kind of character display may be used, such as seven segment displays, alphanumeric displays, or the dot matrix display shown in FIG. 11C.

This is a novel and unobvious method to produce a display with far less computing power and speed than that required to produce a columnar piecewise display and we respectfully submit that the claim should be allowed.

4. The rejection of Claim 2 under 35 U.S.C. 103(a) as being unpatentable over Ohta et al. in view of Molinaroli as applied to claim 1 above, and further in view of the Microsoft Computer Dictionary, 4th ed.

Claim 2

Applicant has canceled Claim 2 and replaced it with Claim 22. Claim 22 now specifically claims a method of storing display data.

The data storage scheme must be easy to employ and must not require too much overhead which uses up scare memory space. For example, "FEEL THE BURN" would be stored as, "fEELtHEbURN". This is a novel approach to data storage which is not obvious and is not

anticipated by Molinaroli or Ohta et al. We respectfully submit that the claim should be allowed.

5. The rejection of Claim 13 under 35 U.S.C. 103(a) as being unpatentable over Ohta et al. in view of Molinaroli as applied to claim 1 above and further in view of Solomon, USPN 6,404,409 B1.

Claim 13

Neither Ohta nor Molinaroli specifically teach each lighted array form part of a graphic image, with parts of a graphic image being displayed as the device is moved through space to form a kinetic light puzzle. Molinaroli and Ohta both teach that the display of graphics is made a slice at a time.

Solomon teaches: During the displacement LED array 12 is driven by the image computer 30 and creates a virtual image 22 by instantaneous changes in the intensity of each LED. The LEDs 12, 14 may be arranged in distinct and complex patterns on the wand 10 including that where output 22 of LED array 12 is directed generally towards observer 26 and the output 24 of LED array 14 is directed generally towards observer 28.

Solomon, col. 3, lines 57-64 and Fig. 1 through Fig. 4 and Fig. 19

Each of Solomon's displays is produced by a dot matrix of individual LEDs arranged in distinct and complex patterns on the wand.

Molinaroli teaches: The microprocessor 13 turns on and off the individual LEDs 12 to allow the display PC board 11, when moved, to give the illusion of alpha-numeric characters, and/or two- or three-dimensional (2-D, 3-D) shapes.

Molinaroli, col. 3, lines 46-50 and figures 1, 2, 4-15, 17-27.

Ohta et al. clearly teaches through figures 1, 6, 11a, 12, 15, 16a, and 16b that the array is linear row of LEDs which will produce a dot matrix type display or in the words of the applicant, a columnar piecewise fashion.

Applicant does not use a dot matrix of individual LEDs, but rather uses an array that appears to be a single light element in the shape of part of the graphic.

Applicant teaches that whole portions of the graphic are displayed at a time. Applicant's Claim 13 specifies that the lighted arrays each form part of a graphic image to be displayed. This limits the lighted array so that it can only display one graphic or portions of that graphic as shown in FIG. 12A- 12D of the applicant's drawings. This is a novel method of displaying graphics which is does not use the teachings or method of Ohta, Solomon, or Molinaroli.

Applicant teaches in FIG. 12A, 12B, 12C, 12D, that the lighted array is not merely a row of light elements, but rather, a complex part of the total graphic. This is shown in FIG. 12A and 12B. 126 is the left puzzle light array. 128 is the right puzzle light array. When the left array is lighted, all lines in the 126 array are lit, thereby; the left half of the smile face is displayed. Later, the right array is lighted, all lines in the 128 array are lit, thereby; the right half of the smile face is displayed. Each of several lighted arrays is shaped like portions of the graphic

to be displayed. When the lighted arrays are moved at the correct rate, the complete smile face is seen.

Applicant is not displaying one column of light at a time, but rather a whole portion of the display at a time. Then the array is not in motion, the blinking design shown in FIG. 12A is all that is seen.

We respectfully submit that the method of shaping each of several lighted arrays like portions of the graphic to be displayed, and displaying them as claimed in Claim 13 was not anticipated by Molinaroli or Ohta et al. and the claim should be allowed.